

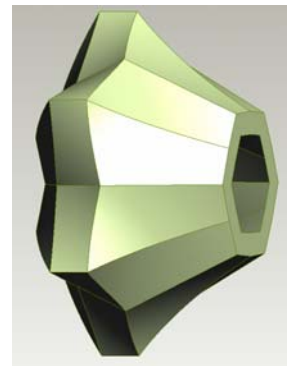
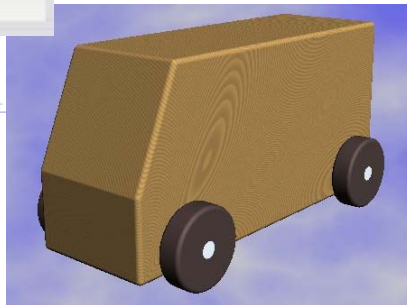
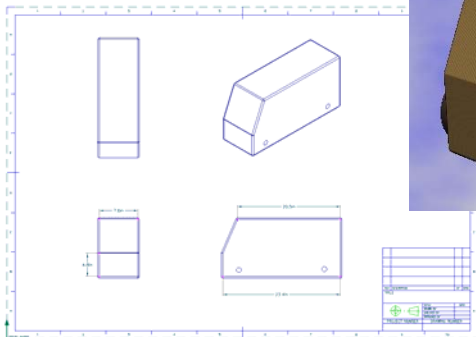
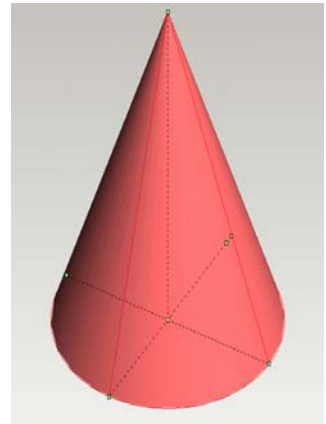
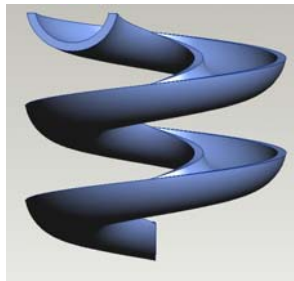
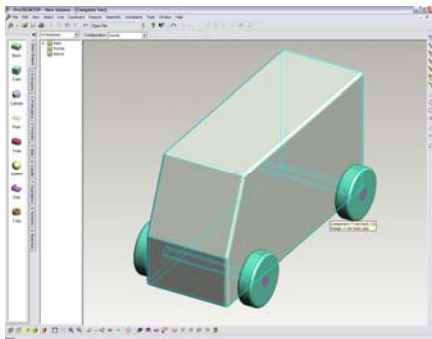
3-D Solid Modeling and Design

Student Learning Activities
for

PTC

Pro/DESKTOP® 8.0

Activity #3



Activity 3:

“Moving and Shaping”

(Flesch-Kincaid readability level = 6.0)

About the program

Pro/Desktop (called ‘PD’ from now on) is a powerful software program that allows you to sketch ideas first, and then work on design details later.

This activity will help you:

- Memorize the icons and their functions that you use to move and shape designs
- Resize and reshape a design

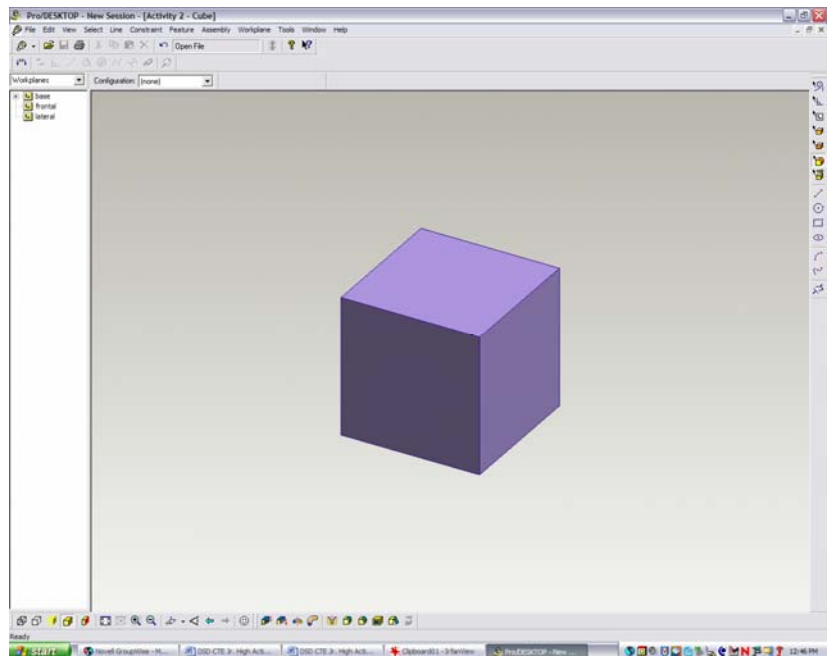
User Terms:

- Features Toolbar Icons
- Views Toolbar Icons
- Design Toolbar Icons
- Top Toolbar Icons

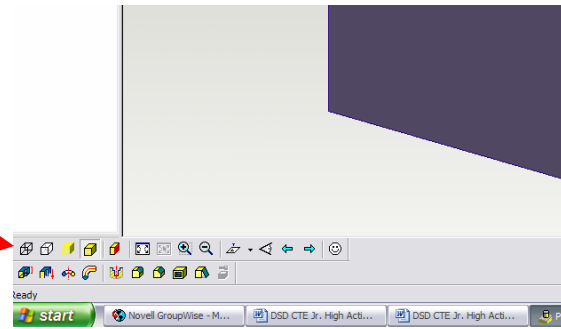
Moving around

Open the saved design (10 x 10 x 10 cube) you made in Activity 2. To do this, click on the **File** pull-down menu and click again on the word **Open**.

Find your file in the location your instructor had you previously save it. When found, it will appear in the Design Field. Don’t worry about the color or the size of your cube.



To change views and to move your design in PD, here are some of the following viewing tools found in the Views Toolbar:



Wire Frame View = Shows only the edges of the design.



Transparent View = Shows the part as transparent, or 'see-through'.



Shaded View = Shows the part as a shaded design.



Enhanced View = The **default** view (view the computer automatically selects). The Enhanced view includes edges and faces.



Section View = Uses a point to view the design as if it were 'cut in half' and looked at where the slice was taken.



Autoscale = Clicking this once will center your design and fit it in the viewable window.



Autoscale Selection = Clicking this once will center the selected **(red)** edge or **surface** in the viewable window.



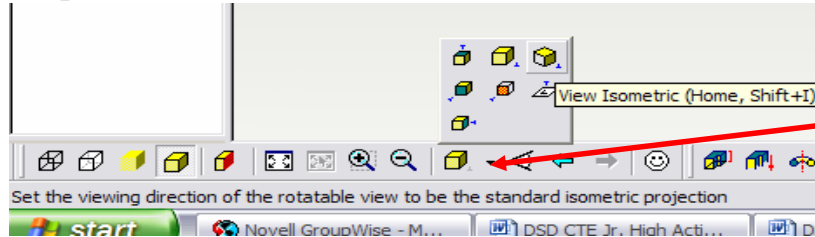
Zoom in = When a point in a design window is clicked and the mouse dragged outward, the box drawn will become the new, 'zoomed-in' Design Field.



Half scale = Each time this button is clicked, the image size shown on the screen is reduced by half. (If your mouse has a 'scrolling wheel', it can be used to scale up or down the image on the screen with each 'click' of the wheel.)



Views = Icons representing the same commands found in the 'View' Pull-down Menu in the Top Toolbar. Clicking the small, black triangle to the right of the **View** icon brings up the different planes of view.



Viewpoints = Lets you save and name the current view in memory and lets you recall, view, and delete other saved views of the design.



Previous View = Returns to the last view.



Next View = Goes to the next view if you have changed views more than once.



Tumble = Clicking Tumble will automatically start random rotation of the design. Clicking Tumble again stops the movement.



Arrow keys = The arrow keys on the keyboard rotate a design around its center axis. **Home** key will return to default view.

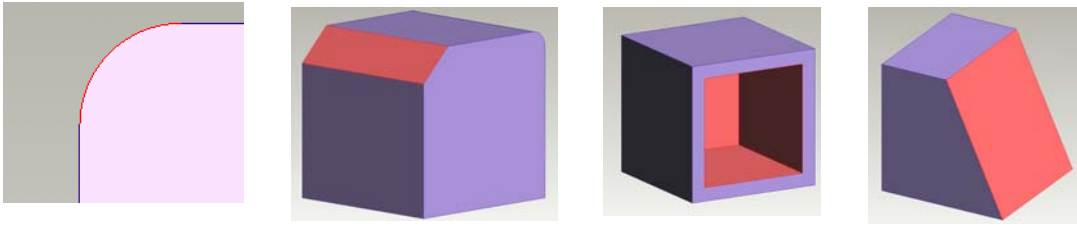
Page Up / Page Down keys = These keys rotate a design by combining 2 arrow key directions at once.

Take some time to change and save views, rotate, zoom, tumble, and scale your drawing. Changing views will not affect your drawing and you do not need to 'Undo' each time you change to a new view. You can create and save viewpoints for your cube if you wish.

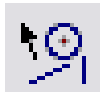
Have fun moving the cube around!

Edges and Surfaces

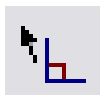
In PD, you can modify edges and surfaces to reshape them.....



These changes are made by selecting the correct icons in the Design Toolbar on the right-hand side of the screen. The icons in the Design Toolbar used for selection are:



Select Lines = Used to select individual lines of a profile.



Select Constraints = Allows you to change the constraints (such as line length) of a profile already drawn on the workplane.



Select Workplanes = Just like the Object Browser Pane, this icon allows you to click on it and then select any one of the workplanes that appear on the screen.



Select Edges = Used to select an edge to modify it.



Select Faces = Used to select a face to modify it.

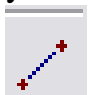


Select Features = Used to select a feature of the design to change it (such as all edges, or all arcs).

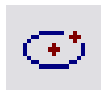


Select Parts = Used to select multiple parts for editing.

The Design Toolbar also holds the icons for basic shapes. Rectangle/square you have already used. The rest are:



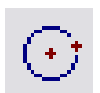
Straight line



Ellipse



Spline (series of lines)



Circle



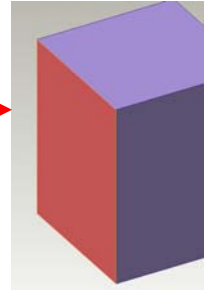
Arc/Fillet




Delete Line Segment




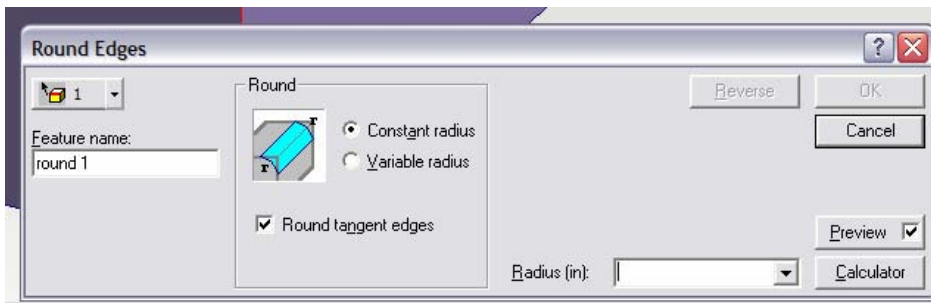
← When you select **one edge** of a design, it will turn **red**. This means that just that one edge is selected for the next command. If a **surface** is **red**, it means that surface is selected for the next command. Whether you are changing an edge or a surface, in PD you will need to **click the EDGE, not the surface** of your design when you want to modify a particular section of it.




Open your file with the cube from Activity 2. Set the view to 'Isometric' and click 'Autoscale'.

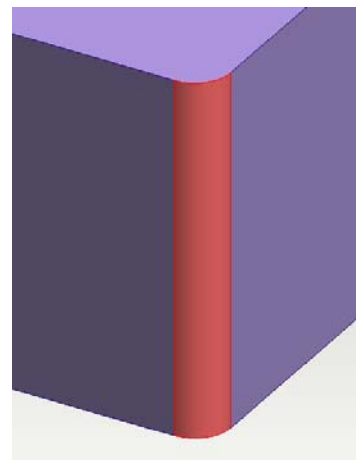
Click on the 'Select Edges' tool  and click the closest facing edge of your cube. The edge will turn **red** to show it is selected for editing (above left picture).

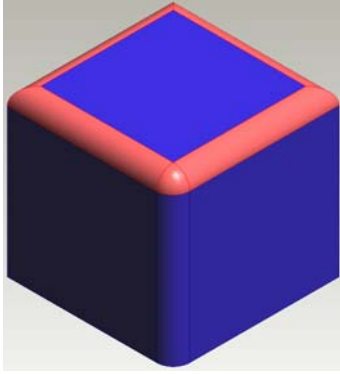
You are going to change the edge to a **fillet** (rounded edge). To do this, click the 'Round Edges' icon  on the Features Toolbar. The following dialogue box will appear:



Enter the number '1' in the **Radius (in):** field. Notice what happens to your design. With the 'Preview' box checked, it shows you a preview of what the finished edge will look like. Now click **OK**. The edge will change to a rounded edge with a 1-inch radius.

You can change all edges of a surface at once. Click the 'Select Faces' icon  in the Design Toolbar. Now click the top surface so it turns **red**.



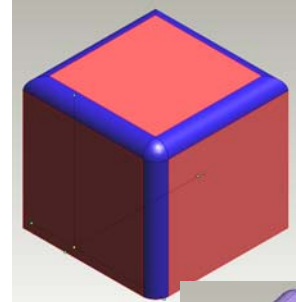


Click again on the 'Round Edges' icon. Enter a 1-inch radius and click **OK**. This speeds up the process of rounding edges when you have more than one edge to edit on a particular surface.

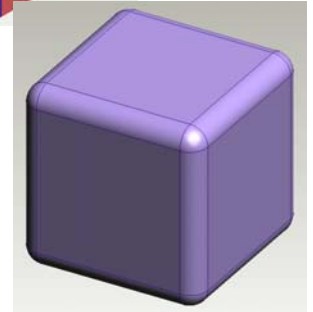
If all edges of an object will share the same features (such as the 1" radius edges), you can use the 'Select Features' option.

Click the 'Select Features' icon. 

Click on any **inside square** of the design. All features (in this design, all edges) will become active for editing and turn **red**. →



Click the 'Round Edges' icon, enter a 1" radius, and click **OK**. Now all edges should have a 1" radius. Use the viewing icons you have learned in this activity to rotate your design and view all edges to make sure they are all rounded to a 1" radius.

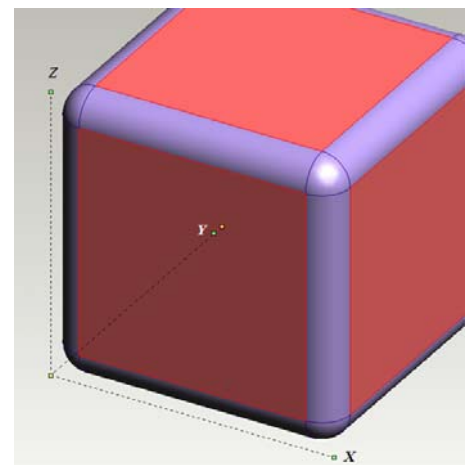


When you are done, set the view to 'Isometric' and click 'Autoscale'.

Save your design according to your instructor's directions.

Another important feature to learn when designing with PD is that you can change the size of the extrusion, even after it is drawn. To do this, click on the inside edge of any surface of your cube so that small, colored squares and dotted lines appear: →

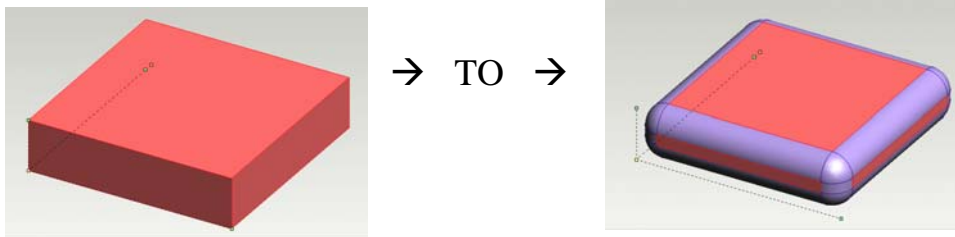
The dotted lines represent the three axes, x, y, z . The **green** squares show the end of the **object edges** from the Point of Origin (**yellow**). The **orange** square rotates the entire design around the point of origin.



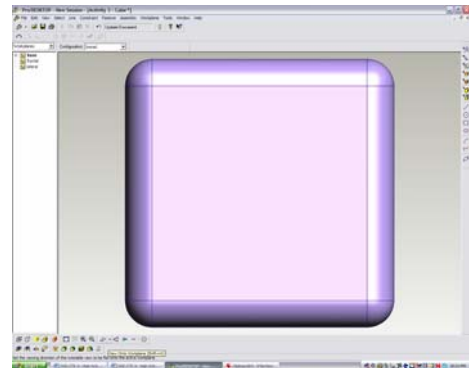
To change the thickness of the design, **click and hold down** on the **green** square at the end of the Z axis. Now move that square back toward the point of origin. The coordinate for the z axis will appear as soon as you start moving. Reduce the z axis to '2.5' and let go of the mouse button. The cube now changes to the new shape. What happened to the rounded edges?






Because you changed the characteristics of the design, PD displays only the basic features of the design. The 'Update' feature will restore all characteristics to your design.

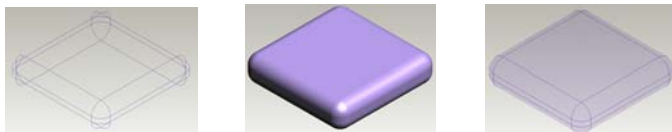
To do this, click on the 'Update'  icon in the Top Toolbar and the design will show the rounded edges once again.



Change the view to the Workplane view, select Autoscale, and **Save** your drawing at this point according to the directions from your instructor. →



Take a moment to see the different looks of your design by using the viewing keys (Wireframe, Transparent, Enhanced, etc.) from the Views Toolbar:     . Rotate your design to see it from several angles.



DO NOT SAVE your changes.

You have completed this activity using PD! Exit the program and complete the following matching assignment on a separate sheet of paper.

Student name: _____ Student Number: _____











Class


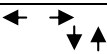














period: _____ Date: _____ Teacher: _____





STUDENT WORKSHEET Pro/DESKTOP 3-D Modeling Software

Activity 3: "Moving and Shaping"

Directions: Write the letter of the most correct definition of the icons used in this activity in the space provided:

Icon	Name and Definition
____1. 	a) Transparent View = Shows the part as transparent, or 'see-through'.
____2. 	b) Shaded View = Shows the part as a shaded design.
____3. 	c) Enhanced View = The default view (view the computer automatically selects). The Enhanced view includes edges and faces.
____4. 	d) Section View = Uses a point to view the design as if it were 'cut in half' and looked at where the slice was taken.
____5. 	e) Autoscale Selection = Clicking this once will center the selected (red) edge or surface in the view window.
____6. 	f) Zoom in = When a point in a design window is clicked and the mouse dragged outward, the box drawn will become the new, 'zoomed-in' Design Field.
____7. 	g) Half scale = Each time this button is clicked, the image size shown on the screen is reduced by half. (If your mouse has a 'scrolling wheel', it can be used to scale up or down the image on the screen with each 'click' of the wheel.)
____8. 	h) Views = Icons representing the same commands found in the 'View' Pull-down Menu in the Top Toolbar. Clicking the small, black triangle to the right of the Views icon brings up the different planes of view
____9. 	i) Viewpoints = Lets you save and name the current view in memory and lets you recall, view, and delete other saved views of the design.
____10. 	j) Select Parts = Used to select multiple parts for editing.

___11.		k) Previous View / Next View When these icons are clicked, the view goes to the next view or returns to the last view if you have changed views more than once.
___12.		l) Tumble = Clicking this icon will automatically start random rotation of the design. Clicking it again stops the movement.
___13.		m) These keys on the keyboard rotate a design in different directions.
___14.		n) Round Edges Changes the edge to a fillet / round edge
___15.		o) Select Lines = Used to select individual lines of a profile.
___16.		p) Select Constraints = Allows you to change the constraints (such as size) of a profile already drawn on the workplane.
___17.		q) Select Workplanes = Just like the Object Browser Pane, this icon allows you to click on it and then select any one of the workplanes that appear on the screen.
___18.		r) Select Edges = Used to select an edge to modify it.
___19.		s) Select Faces = Used to select a face to modify it.
___20.		t) Select Features = Used to select a feature of the design to change it (such as all edges, or all arcs).
___21.		u) Update = Restores all characteristics to your design when clicked.
___22.		v) Delete Line Segment – Click to delete selected lines.
___23.		w) Arc/Fillet – Click to draw an arc.
___24.		x) Spline – Click to draw a series of connected lines.
___25.		y) Rectangle/Square – Click to draw a rectangle or a square (by holding the ‘Shift’ key).
___26.		z) Ellipse – Click to draw an ellipse.

___27.		aa) Line – Click to draw a line.
___28.		bb) Circle – Click to draw a circle.
___29.		cc) Wire Frame View = Shows only the edges of the design.
___30.		dd) Autoscale = Clicking this once will center your design and fit it in the viewable window.